



Università degli Studi di Napoli Federico II

PhD in Biotechnology - 38th cycle

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‘Development of optical biosensors for the detection of environmental DNA’

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The environmental DNA (eDNA) describes the genetic material circulating in environmental samples such as sediment, water and air including whole cells, extracellular DNA and potentially whole organisms.[1]

For decades, the eDNA has been used for ecological studies and for biodiversity monitoring, but nowadays the attention is focusing on this since the potentiality to be applied in the agricultural field for the checking for invasive species and their identification.

Actually, two approaches based on PCR and sequencing are considered but they suffer of high costs due to the primer/probe development and sample processing costs, other than the errors to which they are subjected.

The aim of this project is the development of two kinds of biosensors to make easier and faster the measurement of eDNA. In particular, a colorimetric based biosensor and fluorescence based biosensor will be realized with the ambition to obtain a quantitative and rapid measurement of the concentration of eDNA.

In addition, our biosensors strive to be PCR free and to be used by non-expert personnel.

References

[1] M. A. Barnes and C. R. Turner, “The ecology of environmental DNA and implications for conservation genetics,” *Conserv. Genet.*, vol. 17, no. 1, pp. 1–17, 2016, doi: 10.1007/s10592-015-0775-4.